Phase IV: Coatings Service Life Prediction Consortium

Research starting in 2006

What are the Problems?

Link field and laboratory exposure data for a filled thermoplastic coating and a filled thermoset coating.
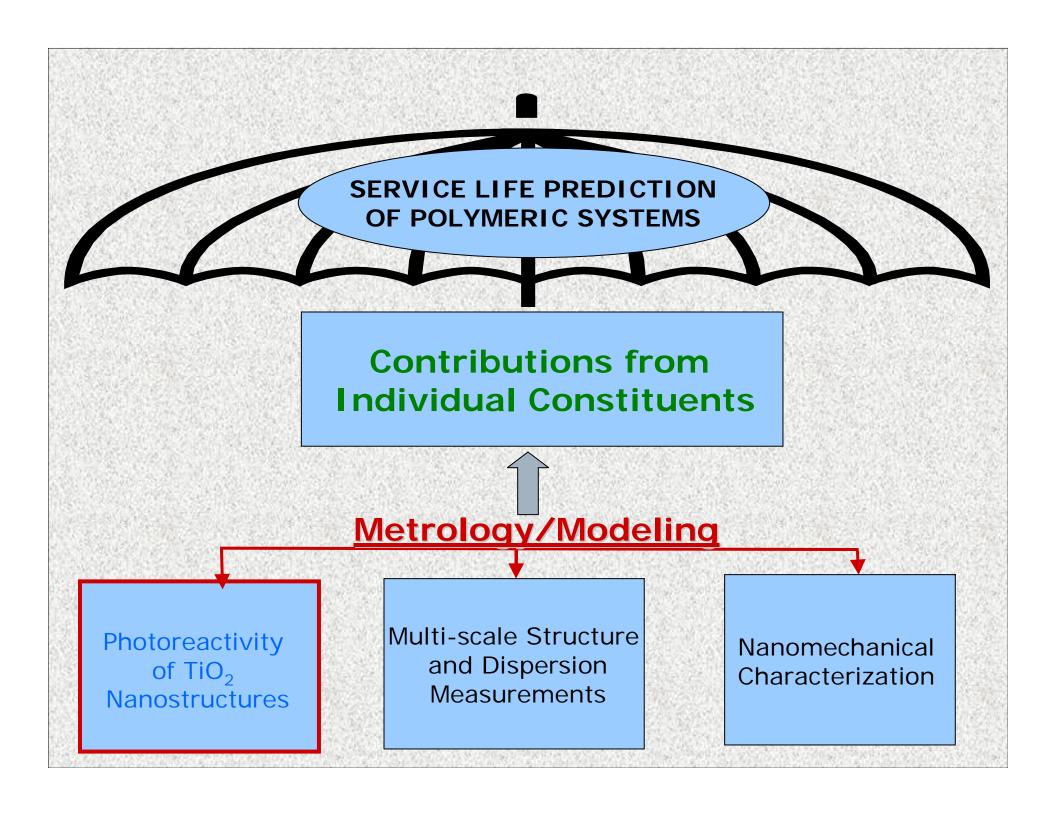
Quantify contribution that **pigments** make to the service life of a coating system

Why is the Problem hard?

- ☐ Almost all previous service life prediction research has been performed on products.

- ☐ Effect of individual constituents unknown.

- ☐ Pigments comprise 30 to 90% of the cost of a paint (Regulski, DuPont, 2004)

- ☐ Research aimed at establishing a program for engineering polymeric products for both initial and long-term performance

SERVICE LIFE PREDICTION
OF POLYMERIC SYSTEMS

Contributions from
Individual Constituents

Metrology/Modeling

Photoreactivity of TiO_2 Nanostructures

Multi-scale Structure and Dispersion Measurements

Nanomechanical Characterization

What is the new technical idea?
Why can we succeed now?

| YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 |

weathering studies on filled epoxy

Weathering studies on clear thermoplastic

weathering studies on filled thermoplastic

Metrologies for pigment photoreactivity

Metrologies for photoreactivity of pigment-filled polymer systems

Metrologies for dispersion measurements

Metrologies for characterizing degradation in filled systems: **Automation of existing techniques** **Investigation of novel techniques**

Metrologies for bulk and nanomechanical characterization (quasi-static)

Metrologies for bulk and nanomechanical characterization (dynamic)

Scratch resistance as a function of aging (output from PIC)

Development of high throughput laboratory and informatics system

☐ UV weathering studies   ☐ Methodologies/metrologies   ☐ External project